

Work Order ID 137871

Wednesday, October 14, 2015 11:22:30 AM

137871

U/R

Page 1

Item ID: D412-664-403

Accept

N900040100

Setup Start

NS1

Revision ID: URE 15-561

Stop

NS2

Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 10/14/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/14/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan: MCS

Date: OCT 14 2015

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start

NR1

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr	Revision Nbr
D412-664-443	A U/R <u>OP 15/11/16</u>

100 Document Control 0.00
DOCUMENT CONTROL

100

DC

Memo

0.00

Doc.Control -USB or Paperwork

Photocopy bluefile & type labels per PPPD412-664-403 CHG001

IX DAS 28 9-89 NOV 03 2015

110

110

CNC Bend 2

CNC Alpha 160 Bender

BENDING MACHINE - CROSSTUBES

Memo

0.03

Bend tube as per Dwg D412-664-443 using CNC bender program _____ and Folio FT _____

****USE (4) DT9824 SHIM BLOC TO CHECK STRAIGHTNESS****

Te 15-10-19

127

127

QC

Quality Control

QC15- Crosstube Dimensional Check

0.00

Memo

0.00

***MARK CUT I

DAS 49 9-89

15/10/19

D412-664-403/137871

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Wednesday, October 14, 2015 11:22:31 AM

Item ID: D412-664-403 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: URF 15-561 Stop ***NS2***
Item Name: 412 Stainless Steel Aft Crosstubes - High
Start Date: 10/14/2015 Start Qty: 1.00 ***1*** Cust Item ID:
Required Date: 10/14/2015 Req'd Qty: 1.00 ***1*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

128

128

Crosstubes

Crosstubes

Memo

CUT TUBE AT HEIGHT ON FAI SHEET

VERF HEIGHT 24.0250 BY QC 15 LEVEL INSPECTOR mml

VERF TWIST 176 BY QC15 LEVEL INSPECTOR mml

187

0.00

0.01

130

130

Crosstubes

Crosstubes

Crosstubes

Memo

1- Drill Tube as per Dwg D412-664-443 Using DT _____ Drill Jigs,
Set-up drill table as per QSI 010

2-Deburr

3- Engrave Part # and Batch # as per Dwg D412-664-443

4-Remove all marks from tube within limits of D412-664-43 DWG.

0.00

0.03

15-10-20

BC

BC

15/10/21

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 Start Date: 10/14/2015 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 10/14/2015 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
140 *140* QC Quality Control	DAS 38 9-89 QC Inspect dimensions to drawing Memo	0.00 0.00				DAS 38 9-89	1		OCT 21 2015
174 *174* Outsource2 Outsource process - NDT	Outsource process - NDT per QSI038 4.1 Memo ISSUE P/O TO ACCUREN: <u>30242</u>	0.00 3.00							CY OCT 23 2015
176 *176* Packaging Packaging	Receive & Inspect for Damage & Mat'l Certs Memo	0.00 0.00							OCT 23 2014 DAS 6 9-89

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Accept

N900040100

Setup Start

NS1

Revision ID: URF 15-561

Stop

NS2

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Start Date: 10/14/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/14/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

NR1

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
178	QC5- Inspect part completeness to step on W/O	0.00				1			<i>JB</i>
178									
QC	Memo	0.00							15-10-29
Quality Control									
180		0.00							DAS
180									41
SprayPaint	SprayPaint	0.01				1			9-89
Spray Painting	Memo								15-10-27
	1-Prime inside & outside crosstube as per QSI 005 4.2 BATCH: <u>133084</u>								
	2- MASK UNDERSIDE OF CROSSTUBE AS SHONE ON DWG BEFORE PAINTING								
	3 -Paint Outside of Tube as per Dart QSI 005 4.2 BATCH: <u>133325</u>								
	4- After painting remove masking and apply matte clear coat per QSI005 4.2 CLEAR BATCH: <u>132664</u>								

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Required Date: 10/14/2015 Req'd Qty: 1.00 ***1*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
190	QC14- Inspect Spray Paint	0.00							
190									
QC	Memo	0.00							
Quality Control									

S. S. 10/14/15

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Item ID: D412-664-403 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: URF 15-561 Stop ***NS2***
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Start Date: 10/14/2015 Start Qty: 1.00 ***1*** Cust Item ID:
Required Date: 10/14/2015 Req'd Qty: 1.00 ***1*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
200	Crosstubes	0.00							DAS
200						1			41
Crosstubes									9-88
Crosstubes									15-10-28

Memo

1- Install center support using scotch-weld DP460 per QSI 015, as per DWG. note 12. Install supports clamps using as per Dwg D412-644-443. Install clamp with rubber cushion as per DWG. note 13. ***ENSURE CLAMPS ARE ON TOP OF CROSSTUBE SUPPORT*** Torque clamps on support to 80-100 IN-LBS AS PER DWG.

A/R scotch-weld DP460 BATCH #: 132895
EXP DATE: 8/16

2- **IF NOT ALREADY PRESENT ON CHAFFING SHEILD.** Apply a thin coat of proseal 890 per QSI 015 on inside concave surface of chafing shield and let cure per manufacturer's instructions. Install prosealed chafing shield onto crosstube by applying a thin coat of proseal 890 onto crosstube. Be sure to eliminate any air gaps. Install and torque clamps on chafing shield to 40-50 IN-LBS AS PER DWG.

A/R Proseal 890 Batch: 133071
EXP DATE: 2/16

AFTER FINISH CURE TIME 24H
START CURE TIME: 15-10-28
FINISH CURE TIME: 15-10-29

PRIOR TO PACKAGING RE-CHECK TORQUE ON CLAMPS AFTER CURED FOR 24H.

Re Adjusted clamps

8/15/10/03.



SEE
Attached

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Item ID: D412-664-403

Accept

N900040100Setup Start ***NS1***

Revision ID: URF 15-561

Stop ***NS2***

Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 10/14/2015 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 10/14/2015 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210	QC5- Inspect part completeness to step on W/O	0.00				1			DAS 38 9-89
210									
QC	Memo	0.00							
Quality Control	PRIOR TO PACKAGING RE-CHECK TORQUE ON CLAMPS AFTER CURED FOR 24H.								NOV 03 2015
220	Pick Kit	0.00							
220									
Packaging	Memo	0.00							
Packaging									
230	QC4- 100% Inspect kits for completeness	0.00							
230									
QC	Memo	0.00							
Quality Control									

1x 8015-11-03

1x DAS 28 9-89 NOV 03 2015

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Item ID: D412-664-403 Accept ***N900040100*** Setup Start ***NS1***
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 Start Date: 10/14/2015 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 10/14/2015 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240	Packaging	0.00				IX	SMB 28 9-89		NOV 03 2015
240									
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPPD412-664-443								
	Location: _____								
	PPP Rev: _____								
250	QC21- Final Inspection - Work Order Release	0.00							NOV 04 2015
250									
QC	Memo	0.00							
Quality Control									

MCS
NOV 04 2015

Picklist Print

Wednesday, October 14, 2015 11:22:34 AM

Page 1

Work Order ID: 137871

137871

Parent Item: D412-664-403

D412-664-403

Parent Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 10/14/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP REV:A 13.10.25 NEW ISSUE DD VERF:JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D412-664-443TRN		Manufactured	No			110	Each	0.0000	1	1			
D412-664-443TRN									**				
Crosstube Turning Detail													
D3595-063-530		Manufactured	No			200	Each	98.0000	2	2			
D3595-063-530									**				
Rubber Cushion 0.63" wide x 5.30" Long													

~~132992~~ B 132992

1 BC 15/10/19

DAS
41
9-89 15-10-28

Location	Loc Qty	Loc Code
FG	1	
82656	1	
LG051	97	
115704	22	
132515	75	

D4909-1		Manufactured	No			200	Each	12.0000	1	1			
D4909-1									**				
Support													

DAS
41
9-89 15-10-28

Location	Loc Qty	Loc Code
LG053	12	
130094	2	
135507	10	

D4910-1		Manufactured	No			200	Each	12.0000	2	2			
D4910-1									**				
Chaffing Shield													

DAS
41
9-89 15-10-28

Location	Loc Qty	Loc Code
LG054	12	
134367	2	
135444	10	

2

Picklist Print

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Parent Item: D412-664-403

D412-664-403

Parent Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 10/14/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

MS21920-26

Purchased

No

200

Each

18.0000

4

4

DAS

41

9-89

15-10-28

MS21920-26

Clamp

**

Location

Loc Qty

Loc Code

LG050

8

109206

6

2

M132045

2

LG057

10

M133234

10

2

MS21920-28

Purchased

No

200

Each

184.0000

2

2

DAS

41

9-89

15-10-28

MS21920-28

Clamp

**

Location

Loc Qty

Loc Code

FG

1

105884

1

LG050

126

M130400

50

M130665

2

M133090

38

M133091

36

LG051

57

M132169

19

2

M132522

38

AN6-40A

Purchased

No

220

Each

144.0000

4

4

DAS

26

9-89

AN6-40A

3/8-24 BOLT X 3" LONG

DAS
28
9-89

Location

Loc Qty

Loc Code

ST286A

144

M131618

20

M131803

100

M133316

24

4x

15-11-03

Picklist Print

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Work Order ID: 137871

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Parent Item: D412-664-403

D412-664-403

Parent Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 10/14/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

AN6-41A

Purchased

No

220

Each

73.0000

2

2

AN6-41A

Bolt

DAS
28
9-89

Location

Loc Qty

Loc Code

ST286A

62

M129913

2

M131957

60

ST333

11

M131618

11

AN960JD616

NAS1149D0663J

Purchased

No

220

Each

0.0000

18

AN960JD616

Washer

DAS
28
9-89

Location

Loc Qty

Loc Code

CCK007

100

m133031

100

ST273A

143

m131624

143

ST305

105

m129909

1

m132262

4

m133134

100

t260a

17

m131317

17

MS21042L6

Purchased

No

220

Each

365.0000

6

6

MS21042L6

Nut

DAS
28
9-89

DAS
26
9-89

DAS
26
9-89

DAS
26
9-89

15-11-03

2k
18
m132256

Lex

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

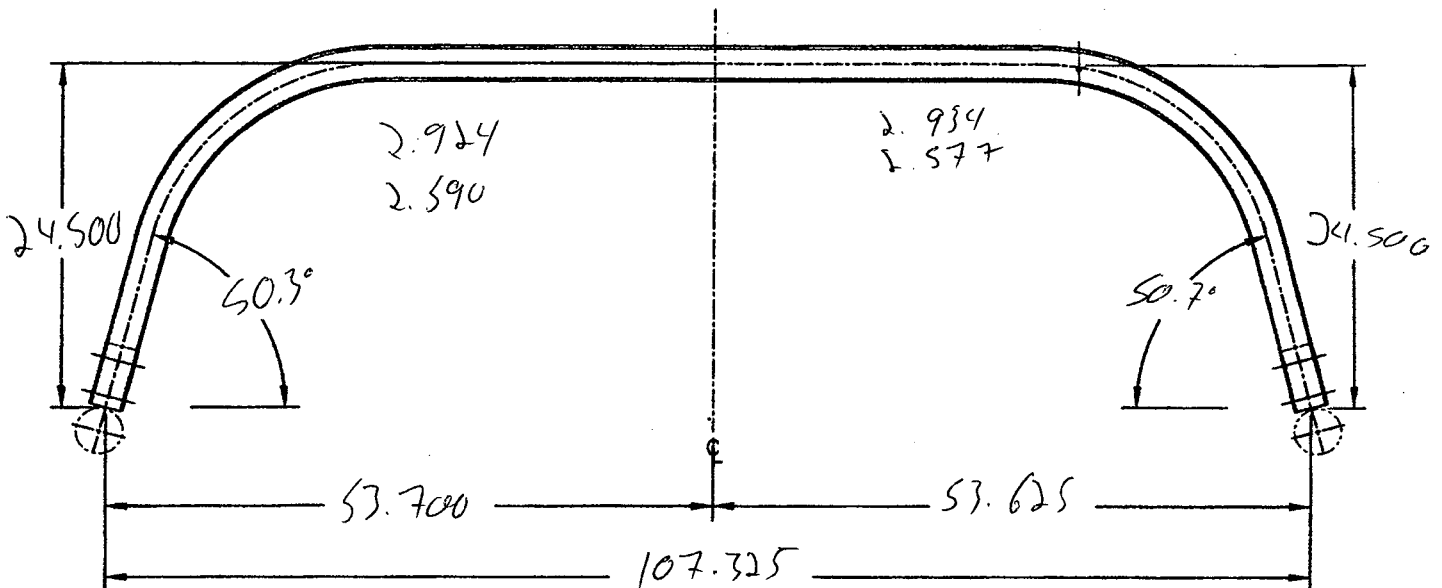
QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date : _____	Step #: _____	QTY Effective : _____		MRB (QSI042) Approval	
Description Work Order Deviation		Disposition		Completed By	
				Lead hand / Supervisor Approval Verification	
				QC / QA Coordinator Approval	
Root Cause Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐		FAULT CATEGORY Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐ Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐			
OTHER : ☐					

DART AEROSPACE LTD		Work Order:	
Description: Crosstube High Aft (412)		Part Number:	D412-664-403
Inspection Dwg: D412-664-443 Rev: A			Page 1 of 1

Required Dimension	Min	Max
Height	24.12	24.62
1/2 Span	53.56	53.82
Angle	49°	52°
Total Span	107.12	107.64
Bending Passes	8	--
Crushing	--	7%



	Side A	Side B
Bending Passes	61	41
Crushing	6.6%	6.4%
Comments		

QC15 Inspection	DAS
Date	49
	9-89 15/10/19

Rev	Date	Change	Revised by	Approved
A	14.07.08	New Issue	KJ	UP

Item	Qty -443	Part Number	Description
1	X	D412-664-443	CROSSTUBE ASSEMBLY (412 HI AFT)
2	1	D6020-132	CROSSTUBE MATERIAL (132" MIN. LENGTH)
3	2	D3595-063-530	RUBBER CUSHION
4	1	D4909-1	SUPPORT
5	2	D4910-1	CHAFING SHIELD
7	4	MS21920-26	CLAMP
8	2	MS21920-28	CLAMP
9	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD
10	A/R	PROSEAL 890	SEALANT

GENERAL NOTES:

- MATERIAL: MANUFACTURED FROM D6020-132
FINISHED LENGTH = 130.10±0.060 (BEFORE BENDING/TRIMMING)
- FINISH: PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C6-2, HATCHED AREA)
PAINT OUTSIDE PER DART QSI 005 4.2
AFTER PAINTING, REMOVE MASKING AND APPLY MATTE CLEAR COAT PER DART QSI 005 4.2
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART P/N "D412-664-443" AND B/N ON INSIDE OF CUFF PER DART QSI 044 6.4 (VIBRATING STYLUS)
- WEIGHT: 90.2 lb AFTER MACHINING
88.7 lb FINISHED WEIGHT
- PART IS SYMMETRIC ABOUT CENTERLINE.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

BENDING

- BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7% (BASED ON O.D.) IN LOWER HALF OF R35 BEND AND 6% (BASED ON O.D.) ON REMAINING TUBE.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038. TO BE PERFORMED AFTER FINAL POST-BEND GRINDING. ANY ADDITIONAL GRINDING REQUIRES ANOTHER LPI INSPECTION.

ASSEMBLY

- INSTALL D4909-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015.
- INSTALL MS21920-28 CLAMPS WITH D3595-063-530 RUBBER CUSHIONS TO SECURE THE D4909-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP OF CROSSTUBE SUPPORT.
- IF NOT ALREADY PRESENT ON CHAFING SHIELD, APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D4910-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D4910-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- TORQUE CLAMPS ON D4909-1 SUPPORT 80 TO 100 IN-LB. TORQUE CLAMPS ON D4910-1 CHAFING SHIELD 40 TO 50 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVES HAVE CURED FOR 24 HOURS.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 137871 MCT
15-10-14

UNDER REVIEW

4/15/14
LRF 15-561

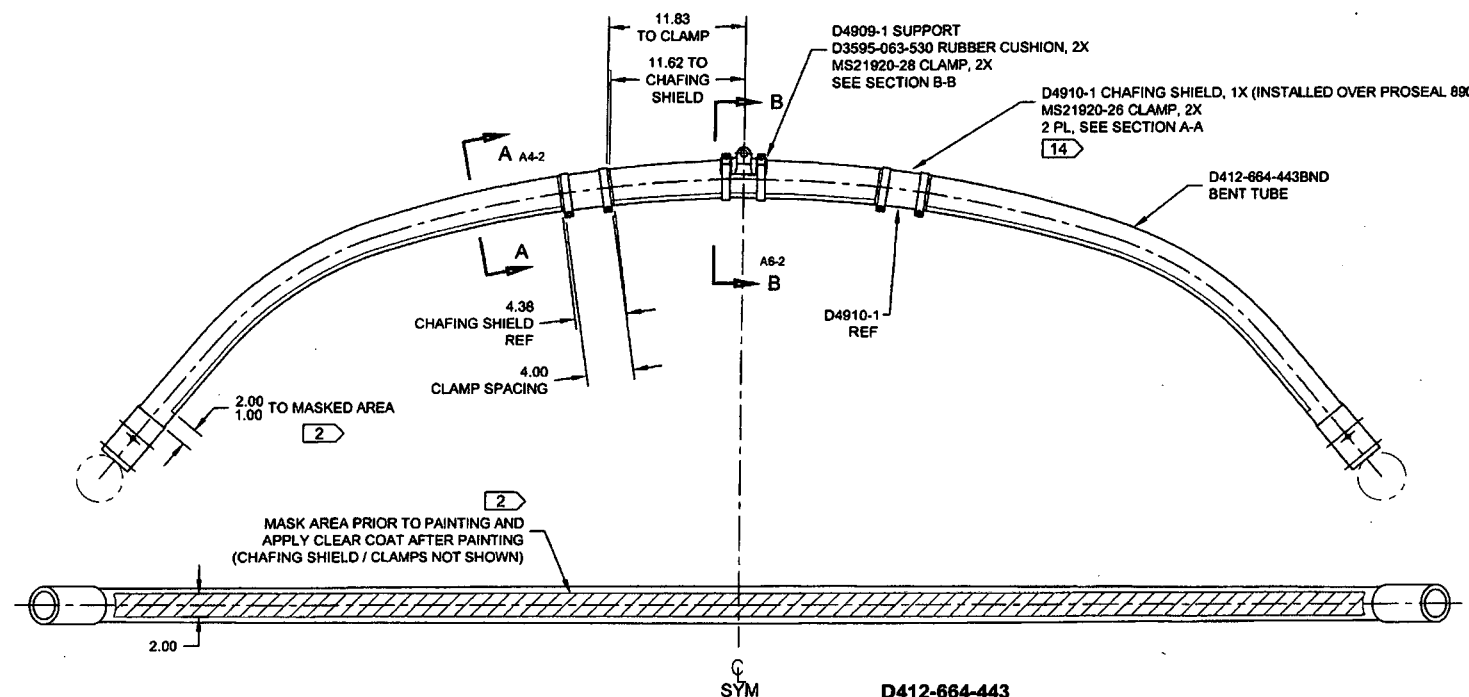
UNDER REVIEW

4/17/14
LRF 15-561

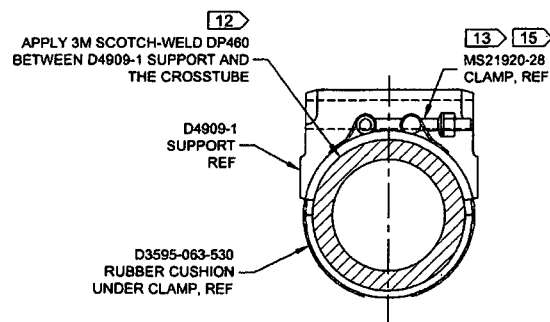
RELEASED
2014-05-26

A	NEW ISSUE	CP	14.04.01
REV.	DESCRIPTION	BY	DATE
DESIGN	90		
DRAWN	90		
CHECKED	90		
MFG. APPR.	90		
APPROVED	90		
DE APPR.	90		
DATE	14.04.01		

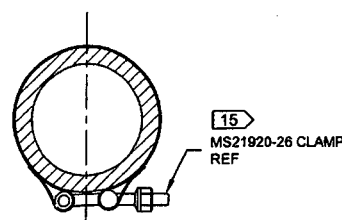
DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D412-664-443	REV. A SHEET 1 OF 4
TITLE CROSSTUBE ASSY (412 HI AFT)	SCALE NTS
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D412-664-443
ASSEMBLY DETAIL



SECTION B-B D4-2
SCALE 4X



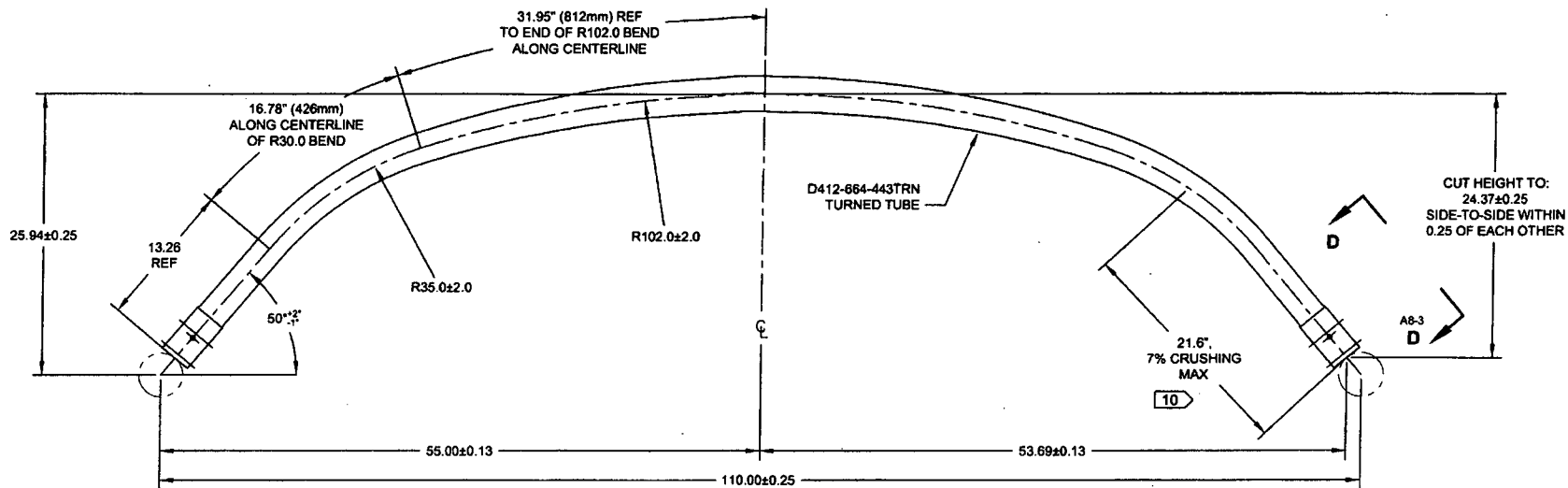
SECTION A-A C6-2
SCALE 4X

UNDER REVIEW
14/7/20

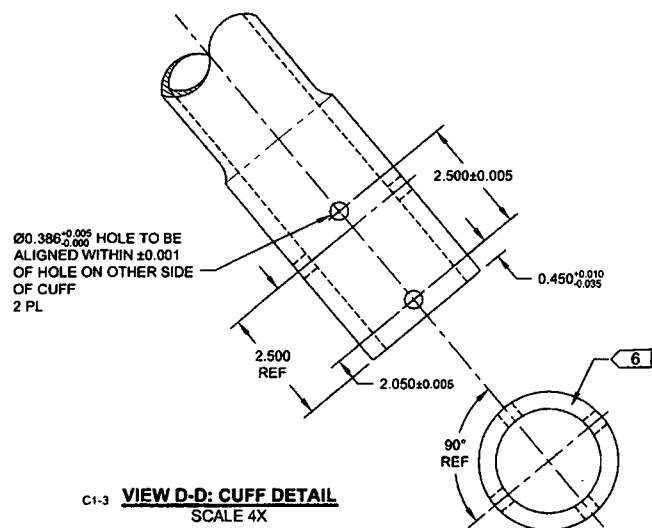
RELEASED
2014-05-26
MD

UNDER REVIEW
15/4/20

DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. A
MFG. APPR.		D412-664-443	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSY (412 HI AFT)	NTS
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D412-664-443BND 10
BENDING DETAIL



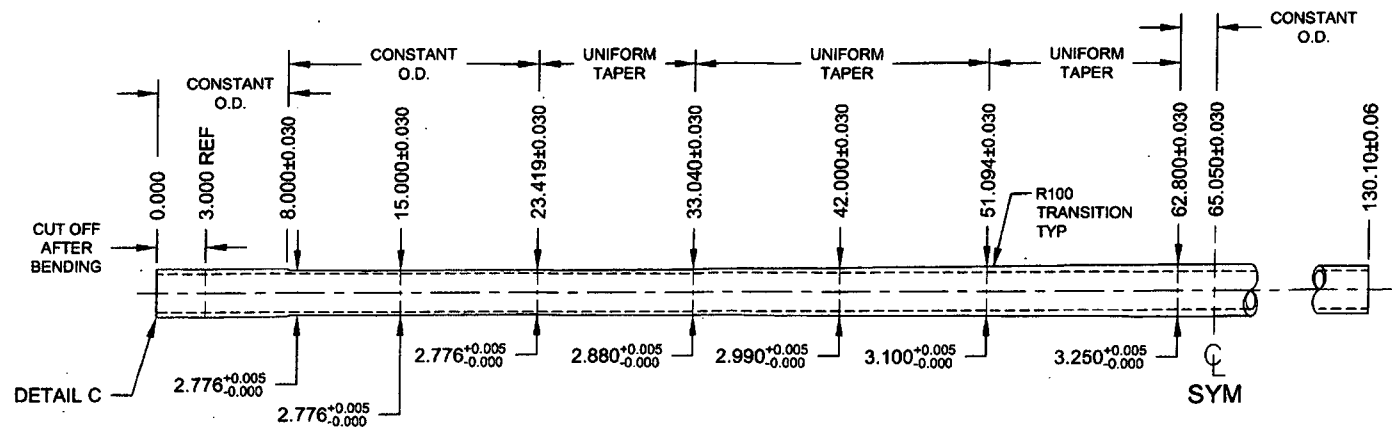
C1-3 **VIEW D-D: CUFF DETAIL**
SCALE 4X

OK **UNDER REVIEW**
P. 11/14 11/7/36 97

UNDER REVIEW
P 15/14/24

RELEASED
2014-05-26
WPD

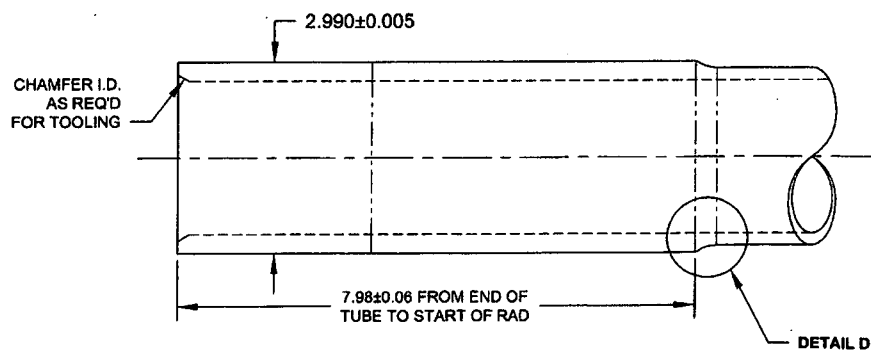
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DRAWN	P	HAWKESBURY, ONTARIO, CANADA	
CHECKED	DW	DRAWING NO.	REV. A
MFG. APPR.		D412-664-443	SHEET 3 OF 4
APPROVED		TITLE	SCALE
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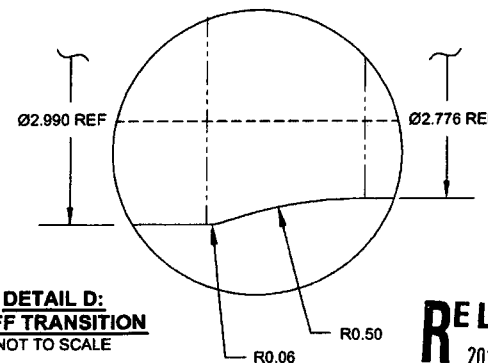
D412-664-443TRN
TURNING DETAIL

UNDER REVIEW

UP 15/4/20



DETAIL C:
CUFF TRANSITION
SCALE 4X



DETAIL D:
CUFF TRANSITION
NOT TO SCALE

RELEASED
2014-05-26

DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. A
MFG. APPR.		D412-664-443	SHEET 4 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
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DQA:

Date: 16/02/09



QA Closed:

Date: 16/02/04

WORK ORDER NON-CONFORMANCE / UPDATE

Work Order update only ☐

Work Order: 137871		DISPOSITION		AGAINST DEPARTMENT/PROCESS			
Part No. D412664403		Rework ☒	Skid-tube ☐	Cross tube ☒	Water Jet ☐	Engineering ☒	
NCR No. 110-5566		Scrap ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	
		Use-as-is ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	
Suspected Unapproved ☐		Large Fab ☐	Composite ☐	Supplier ☐			
Date: 15/10/19	Step #: 200	QTY Effective: 1				MRB (QSI042) Approval	
Description Work Order Deviation		Disposition				DAS 12 15/10/19	
USE AXALTA PRE-TREATMENT PER QSI 005		Axalta B20SS B/N: 132520				Completed By	
why? To improve paint adhesion		Axalta Metabak Z36S B/N: 132474				DAS 41 15-10-26	
						Lead hand / Supervisor	
						Approval Verification	
						DAS 9 9-89	
						DEC 03 2015	
						QC / QA Coordinator	
						Approval	
						DAS 9 9-89	
						DEC 03 2015	
Root Cause		FAULT CATEGORY					
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐		
Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐		
Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐		
Equip/Tooling ☐	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐		
Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐		
Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐		
Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☒		
Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐		
LOA ☐	Product Improvement ☒	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐		
Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐		
Past Expiry Date ☐	Manufacturing Process ☐						
Misidentified ☐	Past Due ☐						
		OTHER:					

D412-664-403 Stainless Steel Hardened Crosstube

setup

3.25" rollers

Bend lines are @ 32", 35" from centerline of tube

1.75" shims are used in the buggy for side bends

TRN # 132992

Middle Bend

Middle bend goes from 35" line with crosstube being on the large table of the machine.

Approach for middle bend is 2870 on both rollers. Run programs middle auto, middle 6 check.

Side Bends

Run programs side 1-10 down the taper from 32" tangent line. Approach is 2900 on Y roller and 3385 on W roller. Programs 1-5 go back to the tangent line ready for next bend. Program 6-10 release at the end. Approaches on programs 6-10 are on the first line of programs... Programs 11-15 run down taper for 9" then come back up to finish tube slowly, be careful with these programs...

Enjoy

Notes:

13/12/12 ran 1 tube, program middle 6 was not enough, prog middle 7 overbent slightly. will create middle 6b to be a halfway point. after program 7 we ran the tube as per folio. one side finished nicely at program 10, the opposite side finished nicely after running program 1 2 times, then 13 to finish. this left the tube closer to max tolerance on the span, 53.730/53.800.

15/06/03 middle auto has been made but, due to the long program, only contains programs 1-5. program 6 must be run separately prior to checking tube on wall.

2	auto	2
4	6	4
6	7	6
7		7
1		1



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID **PC30242**

Purchase Order Date 10/23/2015

PO Print Date 10/23/2015

Page Number 3 of 3

Order From :

VC-SKY001

SKYSERVICE
6120 MIDFIELD ROAD
MISSISSAUGA, ONTARIO L5P 1B1
CANADA

Ship To : DART AEROSPACE LTD

1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

Contact Name

Vendor Phone 905-678-5636

Ship To Contact

Ship To Phone

Ship Via: Delivered

Ship Acct:

Buyer

Chantal Lavoie

Customer POID

Customer Tax # 10127-2607

Terms Net 30

Currency CAD

FOB FCA - (Free Carrier)

Line Total: \$135.00

6 137871

D412-664-403
CROSSTUBE

10/23/2015

1.00

\$135.00 \$135.00

Yes

10/23/2015

LIQUID PENETRANT INSPECTION AS PER QSI 038 OR
LPI AS PER ASTM 1417 LEVEL 2

Line Total: \$135.00

7 137872

D412-664-403
CROSSTUBE

10/23/2015

1.00

\$135.00 \$135.00

Yes

10/23/2015

LIQUID PENETRANT INSPECTION AS PER QSI 038 OR
LPI AS PER ASTM 1417 LEVEL 2

Line Total: \$135.00

PO Total: \$810.00

CL

Note: Terms & Condition of Purchasing(Suppliers) and Procurement Quality Clauses are an integral part of our AS9100 requirements. To learn in detail, please visit www.dartaerospace.com for further explanation.

Change Nbr: 2

Change Date: 10/23/2015

**skyservice****Work Order Traveler**

Sky Service F.B.O. Inc.

DOT APP 53-89 / EASA 145.7142 / BDA AMO 385

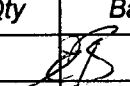
WO #: MWO26184	Customer: Dart Aerospace Ltd.	Dept: NDT YUL	Reference: 30242
Descr:	PN:	S/N:	Qty: 1
Make:	Model:	Reg:	A/C S/N:
TSN:	CSN:	TSO:	
Task: UNSCHEDULED			Sequence: 1

Work Required:

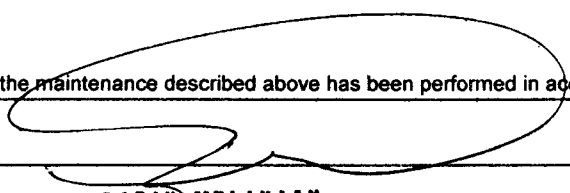
CARRY OUT NDT ON 6 CROSSTUBES AS PER PO30242

4 STAINLESS STEEL CROSSTUBES, ITEM ID# D412-664-403 , WORK ORDER ID# 137312,
137870, 137871, 137872

2 AFT CROSSTUBES , ITEM ID# D212-664-207 , WORK ORDER ID# 136262, 133190

Action Taken:						Date:	Initial/Stamp:
LPI C/O IAW ASTM E-1417M-13 ***NO CRACK FOUND*** PEN. ZL-56, MPO13600, UV M-20141, CLEANER SKC-S MPO13923 , DEV. MPO11715						OCT 23 2015	 
Description	Location	P/N	Qty	Batch	S/N Off	S/N On	
							
				15-10-29			

I certified that the maintenance described above has been performed in accordance with the applicable standard of airworthiness.

Signature: 	ACA/SCA Stamp	Date:
Name: RAFIK MELIKIAN		OCT 23 2015